THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 10

UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

_____

Ex parte DANIEL T. MacLAUCHLAN

_____

Appeal No. 1998-2443
Application No. 08/704,956

_____

ON BRIEF

_____

Before KRASS, BARRETT and GROSS, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claim 21, the sole claim pending in the application.

The invention is directed to a method for determining a liquid level in a container using an electromagnetic acoustic transducer (EMAT). The method is applied to containers having a thin metal wall. Because the thin wall is much more compliant than

a thick wall would be, larger displacements are generated at the metal-liquid interface, resulting in larger signal amplitudes.

Claim 21 is reproduced as follows:

> 21. A method of ultrasonically inspecting liquid contents in a container to determine a liquid level H therein, the container having a thin metal wall in contact with the liquid contents and forming at least one wall of the container, comprising the steps of:
>
> providing an electromagnetic acoustic transducer (EMAT) assembly proximate to the thin metal wall to produce and cause a magnetic field to exist therein;
>
> energizing an eddy current coil of the EMAT assembly with an RF toneburst signal of known amplitude and frequency to generate a Lorentz force in the thin metal wall and cause it to vibrate and launch ultrasonic compressional waves into the liquid contents in contact with the thin metal wall;
>
> allowing the compressional waves to travel through the liquid contents and reflect off an interface, the reflected ultrasonic compressional waves returning through the liquid contents to the thin metal wall in contact therewith and causing the thin metal wall to vibrate in the presence of the magnetic field produced by the EMAT transducer assembly, the vibrations of the thin metal wall inducing a voltage in the eddy current coil of the EMAT transducer assembly; and
>
> measuring a time of flight of the ultrasonic compressional waves through the liquid contents, and using a preestablished value for a velocity of the ultrasonic compressional waves within the liquid contents, calculating the level H of the liquid contents using the measured time of flight and the preestablished velocity value.

The examiner relies on the following references:

Skrgatic	4,580,448	Apr. 08, 1986
Oshima et al. (Oshima)[1]	JP 58-092825	Jun. 02, 1983

Claim 21 stands rejected under 35 U.S.C. § 103 as unpatentable over Oshima in view of Skrgatic.

Reference is made to the brief and answer for the respective positions of appellant and the examiner.

OPINION

We reverse.

Oshima discloses the use of an EMAT positioned adjacent a container for the purpose of measuring the level of a liquid in the container. However, rather than being positioned adjacent a wall of the container in contact with the liquid contents, as claimed, Oshima's EMAT is positioned adjacent a wall of the container in contact with the air, or gas, above the liquid contents.

The examiner recognized this deficiency in Oshima and relied on Skrgatic for the teaching of locating a transducer on the bottom of a container, on a container wall which is in contact with the liquid contents of the container, wherein the level, or depth of the liquid in

[1] Our understanding of Oshima is derived from an English Translation thereof prepared by the United States Patent and Trademark Office. Further, while appellant and the examiner refer to the reference as " Ooshima", it appears that the inventor's name is Oshima and we will refer to the reference as Oshima in our discussion herein.

the container is to be measured. The examiner concluded that it would have been obvious, from the teachings of Oshima and Skrgatic, to place the EMAT of Oshima on the bottom of the container.

Appellant contends that the combination is improper because Oshima deals with an EMAT transducer while Skrgatic deals with a conventional transducer which needs to be in contact with the wall of the container. Thus, concludes appellant, any combination of the teachings of the references would result in either an EMAT in actual contact with the bottom of the container, which would be inoperative since EMATs are not placed in actual contact with a wall, or a conventional transducer located on a wall of a container not in contact with the liquid contents.

Appellant's analysis would seem to require a bodily incorporation of the element of one reference into the device of the other reference. This is not a proper test for determining whether a rejection under 35 U.S.C. § 103 is proper. With regard to what the teachings of the applied references would have suggested to skilled artisans, we agree with the examiner that it would have been obvious to place the ultrasonic wave transducer, 1, of Oshima, at the bottom wall of the container 9, rather than at the top as shown in Oshima's Figure 1. The skilled artisan would have recognized that both the conventional and EMAT transducers were known and the use of either would have been equally obvious to artisans, keeping in mind the advantages and disadvantages

of each. Skrgatic's teaching of placing a transducer at the bottom of the container clearly would have been suggestive of placing a transducer, e.g. the transducer, 1, of Oshima, adjacent the bottom of the container so that the transducer would have been located proximate to the wall in contact with the liquid contents.

However, while we agree with the examiner that the combination of references would have made it obvious to place the transducer of Oshima adjacent the bottom wall of the container, claim 21 also requires the container to have a "thin metal wall" in contact with the liquid contents, that the EMAT be located "proximate to the thin metal wall" and that the thin metal wall be caused to "vibrate and launch ultrasonic compressional waves." Neither of the references discloses a "thin metal wall."

The examiner's position is that a "thin metal wall" is a relative term but the examiner recognizes that in the context of the present invention, a "thin metal wall" is interpreted to be sufficiently thin so as to vibrate and launch compressional waves under the influence of an EMAT in proximity thereto. The examiner then concludes that Oshima's tank comprises such a "thin metal wall." The examiner is correct that a proper interpretation of a "thin metal wall," in the context of the instant invention, would require the wall to be sufficiently thin so as to vibrate and launch compressional waves under the influence of an EMAT in proximity thereto. However, contrary to the

examiner's contention, we find nothing within the translation of Oshima indicating that the container wall proximate to the transducer is sufficiently thin so as to vibrate and launch compressional waves under the influence of an EMAT and the examiner has pointed to nothing within the Oshima disclosure suggesting such a vibration of the container wall or that the container wall in Oshima is a thin wall in the sense that the thickness of the wall is much shorter than the ultrasonic wavelength that would be propagated through the metal forming the wall, as defined at pages 6-7 of the instant specification. We would also note that because instant claim 21 requires the "thin metal wall" to be "in contact with the liquid contents," any "thin metal wall"
in Oshima would need to be located at the bottom of the tank in order to meet the limitations of instant claim 21.

Skrgatic does disclose that an ultrasonic frequency is chosen such that the frequency and the thickness of the container satisfy a defined relationship. Skrgatic further discloses [column 2, lines 9-19] that the frequency is chosen so that the container wall forms a quarter-wavelength plate and that this choice of frequency "avoids any sizeable echo or resonance from the tank." However, Skrgatic does not indicate that the container wall of a "quarter-wavelength" is a "thin metal wall," as set forth in instant claim 21 and, in fact, by the disclosure of avoiding any sizeable echo or

resonance, it would appear, as indicated by appellant at page 7 of the brief, that Skrgatic may be trying to avoid the vibrations sought by appellant. We agree with appellant's analysis in this regard, because we have no evidence to the contrary, and, thus, we do not find that Skrgatic adds anything to the disclosure of Oshima in this regard.

Accordingly, the examiner's decision rejecting claim 21 under 35 U.S.C. § 103 is reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)	
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ANITA PELLMAN GROSS Administrative Patent Judge	)	

eak/vsh

Eric Marich
McDermott Incorporated
Alliance Research Center
1562 Beeson Street
Alliance, OH 44601